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New records of smut fungi. 8. *Testicularia africana* from Tanzania and Mozambique

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Abstract — *Testicularia africana* is reported for the first time from Tanzania and Mozambique. The new records extend its geographical range from Western Africa and Cameroon to Eastern Africa.

Key words — *Anthracoideaceae, Cyperaceae, Rhynchospora,* taxonomy, *Ustilaginomycetes*

Introduction

The genus *Testicularia,* described by Klotzsch (1832), belongs to the *Anthracoideaceae.* This small genus of smut fungi includes three species: *T. cyperi* Klotzsch (known from USA), *T. minor* (Juel) L. Ling (from the Greater Antilles, Colombia, Brazil, and Bolivia), and *T. africana* (from Western Africa and Cameroon). All three are found on plants of *Rhynchospora* (*Cyperaceae*) (Vánky & Piątek 2006, Vánky 2010, 2011, Vánky et al. 2011). Their sori are formed in some spikelets or around the basal part of some of the inflorescence branches of infected plants. Initially, the sori are covered by a thick peridium that later ruptures, becoming sac-like and exposing an agglutinated or granular mass of spore balls. The spore balls characteristically comprise a peripheral layer of dark, thick-walled spores surrounding central mass of thin-walled and light-coloured sterile fungal cells.

Testicularia africana is known only from single collections from Guinea (Macenta Pref., near Macenta; Vánky & Piątek 2006), Cameroon (Menoua Dept., Dschang, Dschang Lake; Vánky 2009), and Sierra Leone (erroneously recorded by Zambettakis 1970: 680 as *T. cyperi;* cf. Vánky & Piątek 2006, Vánky et al. 2011).

In this paper we report two new records of *Testicularia africana* from Tanzania and Mozambique. The collections on which these records are based were obtained during a visit to the herbarium at the Botanic Garden and Botanical Museum Berlin-Dahlem (B).

Material & methods

Dried specimens from the herbarium of the Botanic Garden and Botanical Museum Berlin-Dahlem were examined under light microscope (LM) and scanning electron microscope (SEM). For LM observations and measurements, spores were mounted in lactoglycerol solution (w : la : gl = 1 : 1 : 2) on glass slides, gently heated to boiling point to rehydrate the spores, and then cooled. The measurements of spores are given as min–max (mean ± 1 standard deviation). In the description, the total number of spores (n) from all collections (x) measured is given as '(n/x)'. For SEM, spores were attached to specimen holders by double-sided adhesive tape and coated with gold with an ion sputter. The surface structure of spores was observed and photographed at 10 kV accelerating voltage using a JEOL SM-6390 scanning electron microscope. The description given below is based entirely on the specimens examined.

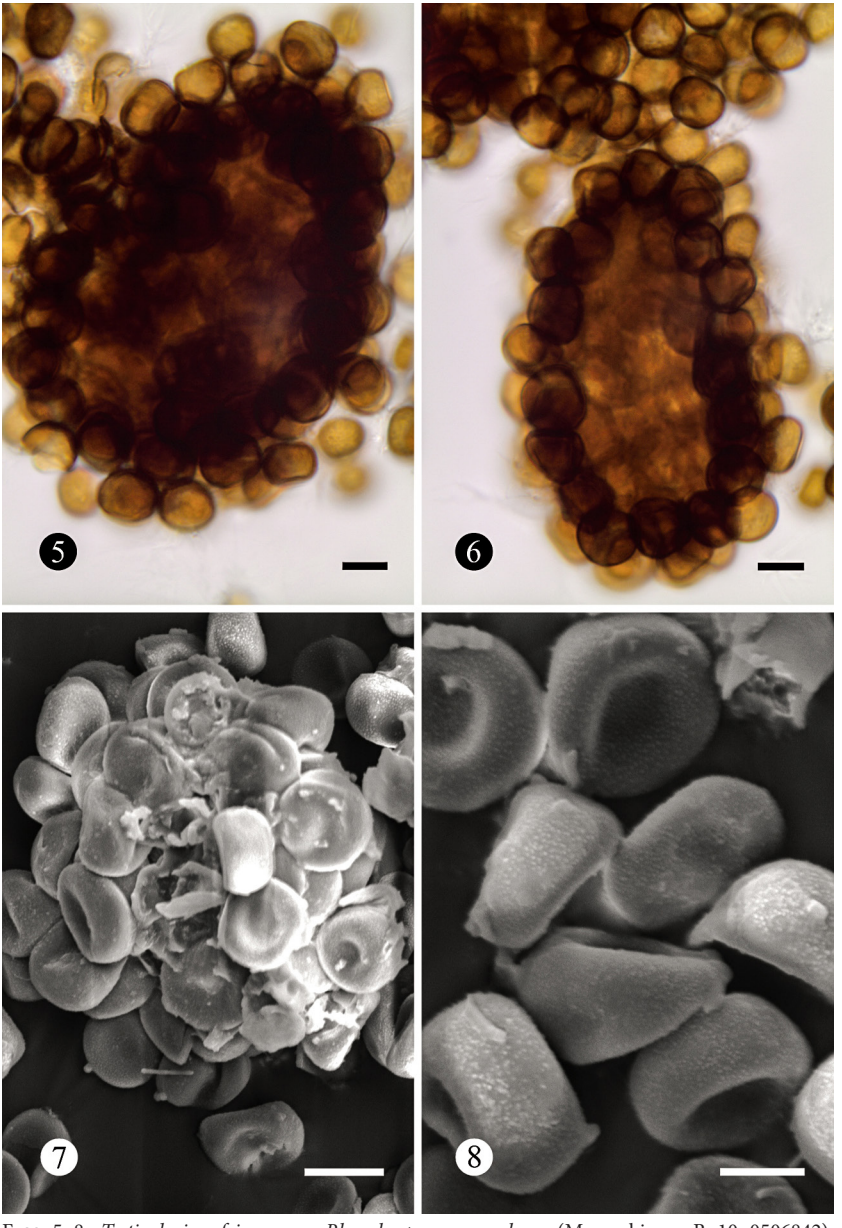
Taxonomy

Testicularia africana Vánky & Piątek, Mycol. Balcanica 3: 164, 2006. Figs 1–8

Sori in some flowers, when young concealed by the glumes that later flake away, 1–3 mm long, or around the basal part of some of the inflorescence branches, 3–9 mm long; globose to ovoid, covered by a thick reddish brown peridium. The peridium of the mature sori ruptures irregularly (becoming sac-like or forming irregular lobes at the base of the sori) to expose an agglutinated blackish brown mass of spore balls. The surface of the peridium smooth in young sori, densely and irregularly cracked at maturity. Spore balls globose, subglobose, broadly ellipsoidal or ovoid, (46–)50–100(–117) × 40–90 µm, composed of an outer layer of loose spores and sterile cells in the central part. Spores often flattened, in plane view orbicular, suborbicular, broadly elliptical or oval in outline, sometimes slightly irregular, in plane view (10.5–)11–14.5(–15.5) × (10–)10.5–12.5(–13.5) (12.8 ± 0.9 × 11.7 ± 0.8) µm (n_2 = 150), medium reddish brown, wall evenly thickened, 0.6–0.9 µm thick, with two lighter areas in the middle of the flattened sides, 3–5 µm in diameter; in LM smooth, in SEM punctate. Spore germination unknown.

Specimens examined — On *Rhynchospora corymbosa* (L.) Britton: **Tanzania, Kigoma Region** (the locality as 'Deutsch-Ostafrika, Uha, zwischen Tare und Bujenze'), 1640–1455 m, 11.III.1926, leg. A. Peter (the plant specimen as A. Peter, Reisen in Afrika 1925/26, no. 38 637, Exkursion V.182) (B 10 0506843); **Mozambique, Sofala Province,** between Beira and Manga (as 'zwischen Beira und Manga, Trollyfahrt, auf dem Wegdamm und auf teilweise nassen Wiesen gegen Manga hin'), 27.IX.1925, leg. A. Peter (the plant name given on the original label as *Cyperus* sp., A. Peter, Reisen

Figs 1–4. Sori (arrow) of *Testicularia africana* on *Rhynchospora corymbosa*. 1, 3. Habit (Mozambique, B 10 0506842); 2, 4. Habit (Tanzania, B 10 0506843). Scale bars: 1, 2 = 1 cm; 3, 4 = 2 mm.



Figs 5–8. *Testicularia africana* on *Rhynchospora corymbosa* (Mozambique, B 10 0506842): 5, 6. Spore balls with an outer layer of dark, thick-walled spores, and sterile cells in the central part, in LM; 7. A spore ball with loosely situated spores on the surface, and parts of some sterile cells between the spores, in SEM. 8. Spores in SEM. Scale bars: 5–7 = 10 µm; 8 = 5 µm.

in Afrika, no. 31 094, Exkursion V.39; later identified by Schultze-Motel 1960: 511, as *R. corymbosa*) (B 10 0506842).

Comments — The new records extend the geographical range of *Testicularia africana* from Western Africa and Cameroon to Eastern Africa. This smut fungus is known to infect only one host species, *Rhynchospora corymbosa,* which is widespread and common with a pantropical distribution. We expect that *Testicularia africana* is more widely distributed in Africa and elsewhere.

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